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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/230,069	04/25/2000	MORDECHAI SEGAL	299.004US2	4909

23494 7590 05/19/2004

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EXAMINER
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LUGO, DAVID B

ART UNIT	PAPER NUMBER
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2634

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DATE MAILED: 05/19/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/230,069

Applicant(s)

SEGAL ET AL.

Examiner

David B. Lugo

Art Unit

2634

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 13 January 2004.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1,2 and 4-22 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,2,4-6,15,17 and 20-22 is/are rejected.
- 7) ☒ Claim(s) 7-14,16,18 and 19 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Oath/Declaration***

1. Acknowledgement is made of the receipt of the substitute declaration of joint inventor Ofir Shalvi. Accordingly, the objection to the declaration is withdrawn.

### ***Response to Arguments***

2. Applicant's arguments, see page 10, paragraphs 2-3, filed 1/13/04, with respect to the rejection of claims 1 and 20 as anticipated by Hulyalkar et al. have been fully considered and are persuasive. The rejection has been withdrawn.
3. Applicant's arguments filed 1/13/04 regarding the rejection of claims 1, 4, 15, 20 and 22 as anticipated by de Lantremange have been fully considered but they are not persuasive.
4. Regarding claims 1 and 20, applicants have amended the claims to require the first filter be adaptive using only the filter inputs and output. It is submitted that in the coefficient update algorithm of de Lantremange, the adaptation depends only on inputs and output of the filter, as the phase compensation feedback is considered a filter input as shown in Fig. 1A.
5. Applicant's arguments, see page 10, with respect to the rejection of claim 17 have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of a different interpretation of the de Lantremange reference.
6. Claims 1, 5, 6, 15, 17 and 20-22 stand rejected, as indicated below.

### ***Claim Objections***

7. Claims 1, 2, and 4-22 are objected to because of the following informalities:

- a. Claim 1, line 5, “complex-valued digital signal” should be --complex valued digital signal-- to provide consistency with other recitations of the limitation in the claim.
- b. Claim 1, line 10, “adaption” should be --adaptation--.
- c. Claim 1, line 13, “inter symbol interference” should be --inter-symbol interference-- to provide consistency with claim 5.
- d. Claim 1, line 14, “symbol-to bit” should be --symbol-to-bit-- to provide consistency with claim 14.
- e. Claim 7, line 8, “the symbol index n” should be --a symbol index n--.
- f. Claim 8, lines 4-5, “ $\delta[n]$  n = 1, 2, ...” should be -- $\delta[n]$ , n = 1, 2, ...,--.
- g. Claim 10, line 4, “the result” should be --a result--.
- h. Claim 11, line 4, “ $\delta[n] = 1, 2, \dots$ ” should be -- $\delta[n]$ , n = 1, 2, ...,-- (see page 7, line 4 of instant application).
- i. Claim 11, “Re” should be defined (see claim 8).
- j. Claim 13, line 4, “the result” should be --a result--.
- k. Claim 16, line 2, “an analog signal” should be --a modulated analog signal-- to provide proper antecedent basis for “the modulated analog signal” in line 4.
- l. Claim 16, line 25, “the phase” should be --a phase--.
- m. Claim 16, line 30, “the amount” should be --an amount--.
- n. Claim 16, lines 33, “the output of a second adaptive” should be --an output of a second adaptive--.
- o. Claim 17, line 9, “pre-equalized complex-valued signal” should be --pre-equalized complex-valued digital signal--.

- p. Claim 18, lines 7 and 10, “pre-equalized complex-valued signal” should be --pre-equalized complex-valued digital signal--.
- q. Claim 19, line 3, “pre-equalized complex-valued signal” should be --pre-equalized complex-valued digital signal--.
- r. Claim 20, line 14, “adaption” should be --adaptation--.
- s. Claim 20, line 17, “inter symbol” should be --inter-symbol--.

Appropriate correction is required.

***Claim Rejections - 35 USC § 102***

- 2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.
- 3. Claims 1, 4, 15 and 20-22 are rejected under 35 U.S.C. 102(e) as being anticipated by de Lantremange U.S. Patent 5,970,093 (cited in previous Office action).
- 4. Regarding claims 1 and 20, de Lantremange discloses in Figure 1 a receiver in a communication system, which inherently comprises a transmitter, the receiver comprising front end unit (20, 24) for performing A/D conversion, demodulation and timing control, a digital equalizer connected to the front end and comprising a first filter 32 and a second filter (Fig. 1B) for reducing noise and intersymbol interference without training data, and inherently comprising a symbol to bit converter for converting the symbol information to a digital bitstream, where the first filter comprises adaptive coefficients where adaptation depends only on prior inputs and output of the filter (see col. 10 – equation 6, Fig. 1A).
- 5. Regarding claim 4, de Lantremange disclose in Fig. 1B that the second filter comprises a phase rotator 42.

Art Unit: 2634

6. Regarding claim 15, de Lantremange shows that the modulated signal is a QAM signal.
7. Regarding claim 21, the intended use of the receiver with a digital subscriber loop of a telephone network is not given patentable weight.
8. Regarding claim 22, the receiver is used with a cable television infrastructure.

***Claim Rejections - 35 USC § 103***

9. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.
10. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over de Lantremange in view of White U.S. Patent 4,005,426.
11. Regarding claim 2, de Lantremange does not disclose that the first filter operates to reduce the eigenvalue spread of the input signal.
12. White discloses an adaptive signal preprocessor that reduces eigenvalue spread, as stated in column 5 lines 40-44.
13. It would have been obvious to one of ordinary skill in the art to use a signal preprocessor that reduces eigenvalue spread as taught by White, in the receiver of de Lantremange to allow the receiver to settle quickly, as stated by White in column 5 lines 40-44.
14. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over de Lantremange in view of Nikias et al. U.S. Patent 5,282,225.
15. Regarding claim 5, de Lantremange discloses that the second filter comprises a feedback network for removing ISI as shown in Fig. 1B, but does not disclose that it is a nonlinear feedback network.

16. Nikias et al. disclose an adaptive equalizer with a nonlinear feedback network in Fig. 5A. It would have been obvious to one of ordinary skill in the art to use the nonlinear feedback network taught by Nikias et al. in the equalizer of de Lantremange in order to provide a rapid adjustment of the equalizer coefficients without using a training sequence (see abstract).

17. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over de Lantremange in view of Ramm et al. U.S. Patent 5,568,558.

18. Regarding claim 6, de Lantremange discloses that the first filter comprises an FIR filter, considered to have a first fixed coefficient, but does not state that its taps are adjusted so its output power is minimized.

19. Ramm et al. disclose an adaptive filter where coefficients are determined to minimize the output power (see abstract).

20. It would have been obvious to one of ordinary skill in the art to minimize the output power to reduce energy consumption and thereby reducing costs.

21. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over de Lantremange in view of Chalmers U.S. Patent 5,640,416.

22. Regarding claim 17, de Lantremange discloses an adaptively equalized self-recovering receiver in a communications system shown in Fig. 1 where A/D conversion and demodulation are performed, the signal is adaptively pre-equalized 32, the pre-equalized signal is adaptively equalized to reduce the ISI without the use of training data (Fig. 2B), and where the complex valued symbol signal is converted to a digital signal. In the receiver of de Lantremange, the signal to conversion to baseband is performed prior to A/D conversion and thus does not disclose

Art Unit: 2634

that the analog signal is converted to a digital signal prior to baseband conversion, where the digital signal is multiplied with sine and cosine signals to produce the digital baseband signals.

23. Chalmers discloses converting a received signal from analog to digital via A/D converter 301, and multiplying the digital signal with sine and cosine signals to produce digital baseband signals (Fig. 3).

24. It would have been obvious to one of ordinary skill in the art to perform A/D conversion prior to converting the signal to baseband by multiplying the digital signal with sine and cosine signals, as taught by Chalmers, in the receiver of de Lantremange as only a single A/D converter is required and DC offsets can be easily removed, as stated by Chalmers in col. 2, lines 40-44.

#### *Allowable Subject Matter*

25. Claim 16 would be allowable if rewritten or amended to overcome the objections set forth in this Office action.

26. Claims 7-14, 18 and 19 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims and amended to overcome the objections set forth in this Office action.

#### *Conclusion*

Any inquiry concerning this communication or earlier communications from the examiner should be directed to **David B. Lugo** whose telephone number is (703) 305-0954.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, **Stephen Chin**, can be reached at (703) 305-4714.



Art Unit: 2634

**Any response to this action should be mailed to:**

Commissioner of Patents and Trademarks

P.O. Box 1450

Alexandria, VA 22313-1450


**or faxed to:**

**(703) 872-9306**

Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal Drive, Arlington, VA, Sixth Floor (Receptionist).

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Technology Center 2600 Customer Service Office whose telephone number is (703) 306-0377.

dl  
5/14/04

  
**YOUNG T. TSE**  
**PRIMARY EXAMINER**